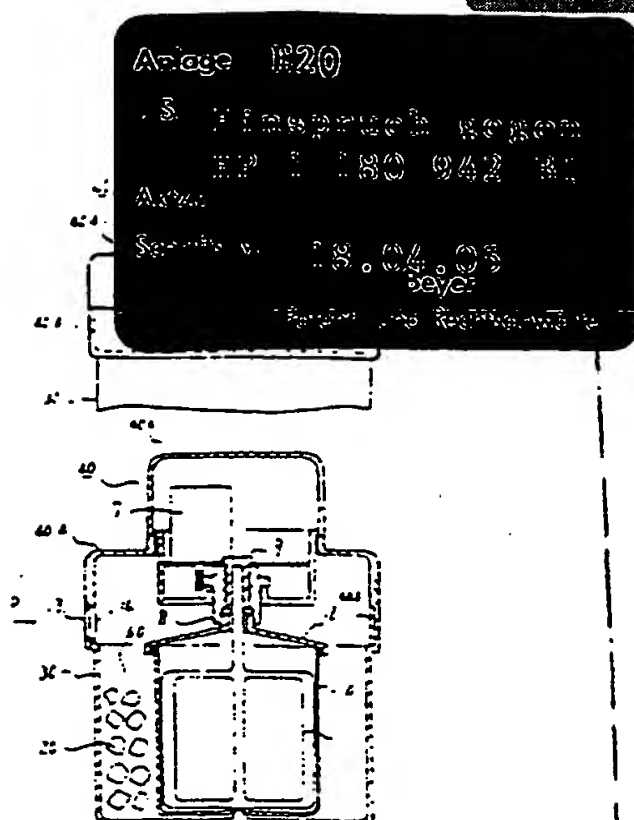


(54) ICE CREAM FREEZER

(11) 56-29960 (A) (43) 25.3.1981 (19) JP
 (21) Appl. No. 54-105864 (22) 22.8.1979
 (71) HITACHI SEISAKUSHO K.K. (72) NOBUYUKI KUSHIBIKI(3)
 (51) Int. Cl. A23G9/10

PURPOSE: To improve the cooling efficiency of an ice cream freezing vessel and reduce the necessary amount of the cooling material, by furnishing the cooling material container of an ice cream freezer with a closable opening for the feeding of the cooling material, thereby enabling the feeding of additional cooling material to the container.

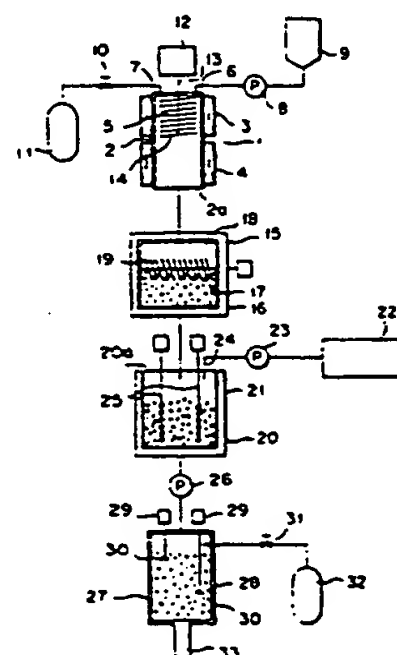
CONSTITUTION: Raw materials of ice cream are placed into a cream-stirring vessel 10, and cooling materials such as ice, salt, etc. are put in the cooling material container 60 of the cooling vessel 30. The ice cream raw materials are stirred with stirring blades 11, and cooled with the cooling materials 20 to obtain ice cream. When the amount of the cooling materials are decreased by melting during the freezing operation, the body 40b supporting the driving means is turned to align the opening 14 with the opening 13 for the feeding of the cooling materials, and the additional cooling materials are charged into the vessel through the opening 13.

**(54) APPARATUS FOR PREPARATION OF CARBONATED ICE**

(11) 56-29961 (A) (43) 25.3.1981 (19) JP
 (21) Appl. No. 54-105942 (22) 22.8.1979
 (71) TAKUZOU ICHIHARA (72) TAKUZOU ICHIHARA
 (51) Int. Cl. A23G9/20, F25C1/00

PURPOSE: To improve the efficiency for the preparation of carbonated ice used in the preparation of ice cream containing carbonated ice, by cooling and freezing water in the presence of carbon dioxide gas under stirring.

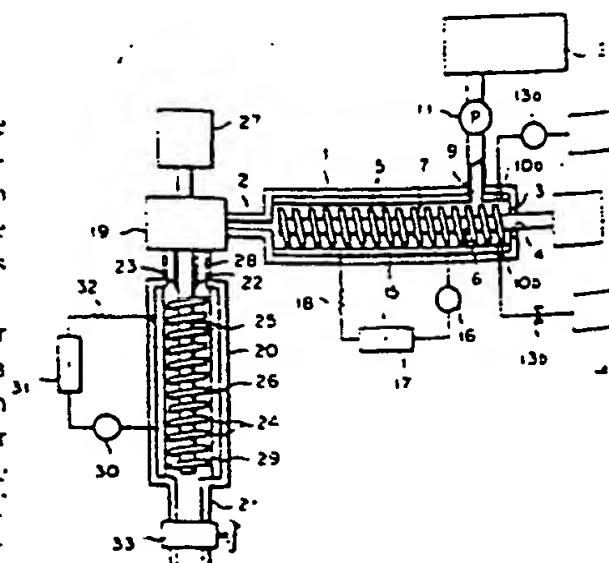
CONSTITUTION: A cylinder 2 cooled to a low temperature by coolers 3 and 4 is fed with water from the water tank 9 and at the same time, with carbon dioxide gas from the carbon dioxide gas bomb 11. The water and the gas are mixed together with a stirring means 5, and frozen at $-10 \sim -20^\circ\text{C}$. The carbonated ice cubes in the freezer 1 are released through the outlet port 2a into the crusher 15 by the pressure of the supplied water. The ice cubes are crushed to granules or pellets, continuously, by the crushing means 19 in the body 17 of the crusher 15. The crushed carbonated ice is mixed in the subsequent mixing tank 20 with the raw materials of ice cream sent from the raw material supply source 22 by a mixing means 25. The mixture is pumped into a stirrer 27 with a pump 26, and stirred with stirring blades 30 together with air supplied from the air bomb 32 to obtain ice cream containing carbonated ice.

**(54) APPARATUS FOR PREPARATION OF FROZEN FOOD**

(11) 56-29962 (A) (43) 25.3.1981 (19) JP
 (21) Appl. No. 54-105944 (22) 22.8.1979
 (71) TAKUZOU ICHIHARA (72) TAKUZOU ICHIHARA
 (51) Int. Cl. A23G9/20

PURPOSE: To prepare a high-quality food such as gas-filled ice cream, preventing the escape of gas from the frozen food, by the use of a specific apparatus for the preparation of carbonated ice cream, etc., wherein the apparatus is composed of two cylinders connected in series and each having a stirring means and a cooler, and the mixture of the raw materials and the gas stirred and cooled in the first cylinder is cooled again in the second cylinder.

CONSTITUTION: The first cylinder 1 having inner stirring blades 5 and an outer cooler 15 is furnished at one end with the raw material inlet 9 and the gas inlets 10a and 10b, and at the other end with the outlet 2. The outlet 2 is connected through the connecting box 19 and the path 28 with the second cylinder 20 having the inner stirring blades 26 and the outer cooler 29 and furnished with the outlet 21 at the opposite side to the first cylinder 1. The raw materials are cooled to about -10°C in the first cylinder 1, and subsequently cooled to a lower temperature, e.g. $-20 \sim -40^\circ\text{C}$, in the second cylinder 20. Carbon dioxide gas is entrapped with the raw materials during the stirring in the first cylinder 1, and carbonated ice cream can be



F.P.C.T.

⑨ 日本国特許庁 (JP)

⑩ 特許出願公開

⑪ 公開特許公報 (A)

昭56—29962

⑫ Int. Cl.³

識別記号

庁内整理番号

⑬ 公開 昭和56年(1981)3月25日

A 23 G 9/20

6926—4 B

発明の数 1

審査請求 未請求

(全 3 頁)

⑭ 冷凍食品の製造装置

⑮ 発明者 市原卓蔵

藤沢市鵠沼桜ヶ岡 2 の 10 の 19

⑯ 特 願 昭54—105944

⑰ 出 願 人 市原卓蔵

⑱ 出 願 昭54(1979)8月22日

藤沢市鵠沼桜ヶ岡 2 の 10 の 19

明 細 書

明の名称 冷凍食品の製造装置

所請求の範囲

原料供給口およびガス供給口を備えた第1のシリンダと、この第1のシリンダ内に設けられ駆動係と運動して回転し、原料を攪拌する第1の攪拌機構と、上記第1のシリンダに設けられ攪拌中の原料を冷却する第1の冷却器と、上記第1のシリンダと連通し第1のシリンダ内で冷却されて得られた冷凍食品を収容する第2のシリンダと、この第2のシリンダ内に設けられ駆動係と運動して回転し、冷凍食品を攪拌する第2の攪拌機構と、上記第2のシリンダに設けられ攪拌中の冷凍食品を上記第1のシリンダにおける冷却温度より低温に冷却する第2の冷却器とを具備したことを特徴とする冷凍食品の製造装置。

明の具体的な説明

この発明はたとえば炭酸ガス入りのアイスクリームなどの冷凍食品を製造するための製造装置に関する。

図に関する。

そして、この発明の目的とするところは、第1のシリンダと第2のシリンダにそれぞれ攪拌機構を備えるとともに冷却器を備え、第1のシリンダによつて原料とガスを攪拌しながら冷却し、得られた冷凍食品を第2のシリンダによつてさらに低温で攪拌冷却させ、冷凍食品中に、封入されたガスが漏出することがない冷凍食品を連続的に製造することができる冷凍食品の製造装置を提供しようとするものである。

以下、この発明を図面に示す一実施例にもとづいて説明する。図中1は模型に設置された第1のシリンダで、この先端には圧出口2、後端には軸受3を有する貫通口4が穿設されている。この第1のシリンダ1内には螺旋状の攪拌翼5を有する回転軸6が回転自在に挿入され、第1の攪拌機構7を構成している。この第1の攪拌機構7の回転軸6に上記貫通口4を貫通して後方に突出されていて、この端部は電動機などの駆動係8に運動している。

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さらに、第1のシリンダ1の後端側に位置する外壁にはアイスクリームの原料を供給する原料供給口9と炭酸ガスを供給するガス供給口10aおよび空気供給口10bが設けられている。そして、上記原料供給口9はポンプ11を介して原料供給管12に、ガス供給口10aは弁13aを介してガス供給管14aに、空気供給口10bは弁13bを介して空気供給管14bにそれぞれ接続されている。さらに、第1のシリンダ1の内周壁には第1の冷却器15が設けられていて、これは圧縮機16、凝縮器17、キャピラリチューブ18とともに冷凍サイクルを構成するように接続され、第1のシリンダ1内の原料を約-10℃程度に冷却するようになっている。

また、第1のシリンダ1の出口2には連絡ボックス19が連結され、この連絡ボックス19には堅型に設置された第2のシリンダ20が連結されている。この第2のシリンダ20の先端には出口21が設けられ、後端には給受22を有する貫通口23が穿設されている。そして、この第2の

(3)

供給口10bから空気を供給すると、原料は第1のシリンダ1内の攪拌翼5によつて攪拌されるとともに-10℃程度に冷却される。したがつて、原料は混練され軟質の冷凍食品すなわちソフトクリーム状となる。このようにして第1のシリンダ1内で得られた軟質の冷凍食品は攪拌翼5の回転に伴つて徐々に出口2から吐出され、連絡ボックス19内から注入通路28を介して第2のシリンダ20内に投入される。したがつて、第2のシリンダ20内の攪拌翼5によつて攪拌されるとともに第2の冷却器29によつて-20℃〜-40℃に冷却され、比較的硬質の冷凍食品が得られる。この場合、冷凍食品内には第1のシリンダ1内で混練中に供給された炭酸ガスが封入されるため、炭酸ガス入りのアイスクリームが得られ、第2のシリンダ20の出口21から吐出してカップ等に収容しても封入された炭酸ガスが漏出することはない。

なお、上記一実施例においては、アイスクリームの製造について述べたが、この発明は上記

(5)

シリンダ20内には攪拌翼24を有する回転軸25が挿入され、第2の攪拌翼26を構成している。この第2の攪拌翼26の回転軸25は上記貫通口23を貫通して上方へ突出されていて、この突出部は原料などの流動保持に連動している。さらに、上記第2のシリンダ20の後部には連絡ボックス19内の冷凍食品すなわち第1のシリンダ1内で得られた冷凍食品を第2のシリンダ20へ投入するための投入通路28が設けられている。また、この第2のシリンダ20の内周壁には第2の冷却器29が設けられていて、これは圧縮機30、凝縮器31、キャピラリチューブ32とともに冷凍サイクルを構成するように接続され、第2のシリンダ20内の原料を約-20℃〜-40℃程度に冷却するようになっている。さらに、上記出口21にはコック33が設けられている。

しかして、駆動源8、27を作動させるとともに両冷凍サイクルを連転した状態において、原料供給口9からアイスクリームの原料を供給するとともにガス供給口10aから炭酸ガス、空気

(4)

実施例に限定されず、他の冷凍食品にも適用できること勿論である。

この発明は以上説明したように、第1のシリンダと第2のシリンダにそれぞれ攪拌機構を備え、第1のシリンダによつて原料とガスとを攪拌しながら冷却し、得られた冷凍食品を第2のシリンダによつてさらに低温で攪拌冷却させるようにしたから、ガス入りの冷凍食品を連続的に製造することができ、しかも、前段で得られた冷凍食品を後段でさらに低温に冷却することにより封入したガスが漏出することなく、品質の高い冷凍食品を得ることができる。また、構造的にも簡単であるから廉価に提供できるという効果を奏する。

4. 図面の簡単な説明

図面はこの発明の一実施例を示す縦断正面図である。

1…第1のシリンダ、7…第1の攪拌機構、8…駆動源、9…原料供給口、10a…ガス供給口、15…第1の冷却器、20…第2のシリンダ、

(6)

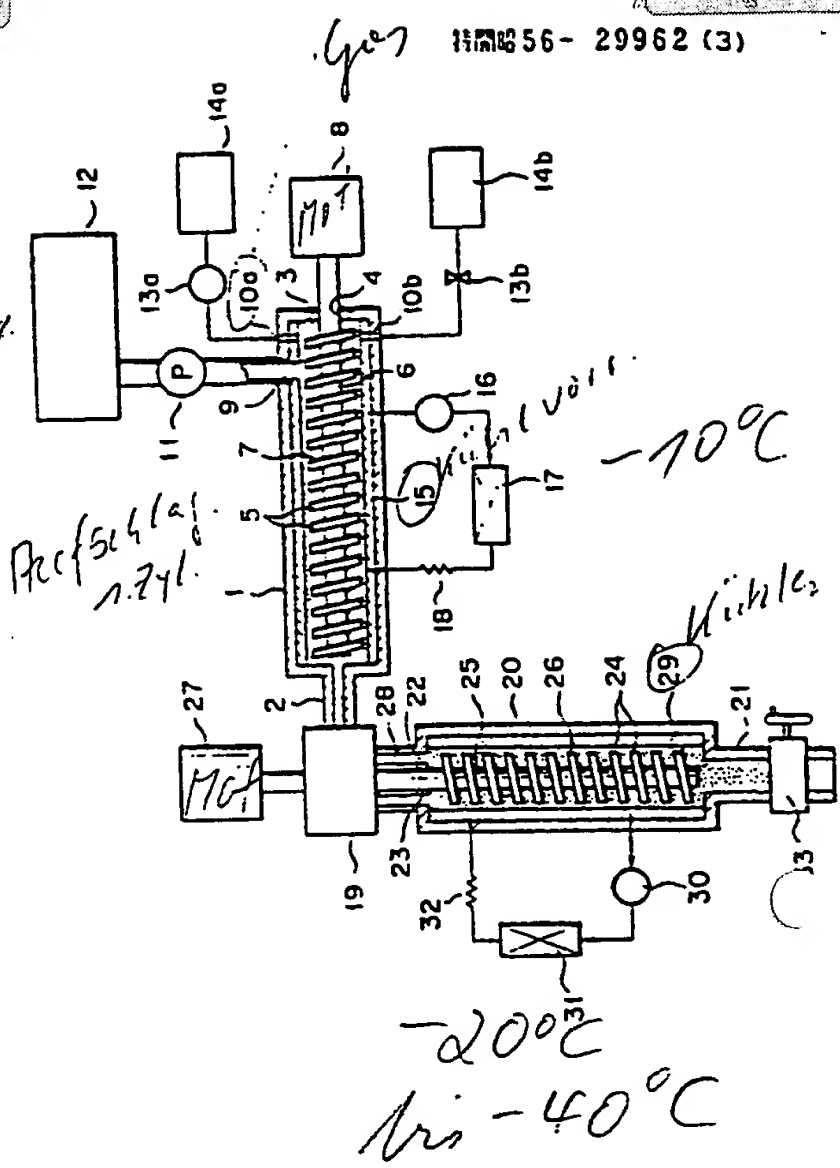
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26...第2の投料機構、27...駆動源、29...第2の
冷却器。

出願人 市原 卓 郎

Ref. 56412
1.741



せるととも
おいて。原
料を供給す
ガス、空気

17

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す凝断正面図

の投料機構。
18...ガス供給
のシリンド。

(19) JAPANESE PATENT OFFICE (JP)
(12) LAID-OPEN PATENTS GAZETTE (A)

(11) Laid-open Patent Application No. 56-29962

(43) Laid open 25 March 1981

(51) Int. Cl.³ Identification Code Patent Office File No.
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Number of inventions : 1

Request for examination : None (Total 3 sheets)

(54) Frozen food product manufacturing apparatus

(21) Patent Application No. 54-105944

(22) Application date : 22 August 1979

(72) Inventor

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(71) Applicant

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SPECIFICATION

1. TITLE OF THE INVENTION

Frozen food product manufacturing apparatus

2. WHAT IS CLAIMED IS :

Frozen food product manufacturing apparatus which comprises a 1st cylinder which is provided with a raw material supply port and a gas supply port, a 1st stirring mechanism which is provided in said 1st cylinder, which is connected to a drive source and rotates and which stirs said raw material, a 1st cooler which is provided in said 1st cylinder and by which said raw material is cooled while it is being stirred, a 2nd cylinder which is connected to said 1st cylinder and receives the frozen food product which has been produced by stirring and cooling in said 1st cylinder, a 2nd stirring mechanism which is provided in said 2nd cylinder, which is connected to a drive source and rotates and which stirs said frozen food product, and a 2nd cooler which is provided in said 2nd cylinder and by which said frozen food product, while being stirred, is cooled to a temperature which is lower than the cooling temperature in said 1st cylinder.

3. DETAILED DESCRIPTION OF THE INVENTION

The present invention relates to a manufacturing apparatus for manufacturing a frozen food product such as, e.g., ice cream containing carbon dioxide.

The object of the invention is to provide a frozen food product manufacturing apparatus in which a 1st cylinder and a 2nd cylinder are provided with respective stirring mechanisms, raw materials and gas are cooled by the 1st cylinder while being stirred, and the resulting frozen food product is stirred and cooled to a still lower temperature by the 2nd cylinder, so making possible the continuous manufacture of a frozen food product with which there is no escape of gas which has been incorporated.

Below, the invention will be described with reference to one example of practice which is shown in the drawing. In the drawing, 1 is a horizontally disposed 1st cylinder, at whose

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front end there is a pour-out port 2, and at whose rear end there is a pass-through opening 4 provided with a bearing 3. A rotation shaft 6 which has a stirrer blade 5 in spiral form is inserted in this 1st cylinder 1 in a manner permitting rotation, so constituting a 1st stirring mechanism 7. The rotation shaft 6 of this 1st stirring mechanism 7 passes through the pass-through opening 4 and projects rearwardly, and its end portion is connected to a drive source 8 such as an electric motor, etc.

Further, a raw material supply port 9 for the supply of ice cream raw materials, a gas supply port 10a for the supply of carbon dioxide and an air supply port 10b are provided in the outer wall which is located at the rear-end portion of the 1st cylinder 1. The raw material supply port 9 is connected via a pump 11 to a raw material supply source 12, the gas supply port 10a is connected via a valve 13a to a gas supply source 14a, and the air supply port 10b is connected via a valve 13b to an air supply source 14b. Further, on the inner peripheral wall of the 1st cylinder 1, there is installed a 1st cooler 15, which is connected to a compressor 16, a condenser 17 and a capillary tube 18 in order to establish a freezing cycle, the arrangement being that the raw materials in the 1st cylinder 1 are cooled to about -10°C .

A junction box 19 is connected to the pour-out port 2 of the 1st cylinder 1, and a vertically disposed 2nd cylinder 20 is connected to this junction box 19. A pour-out port 21 is provided at the front end of this 2nd cylinder 20, and a pass-through opening 23 provided with a bearing 22 is opened in its rear end. A 2nd stirring mechanism 26 is constituted by inserting into the 2nd cylinder 20 a rotation shaft 25 which possesses a stirrer blade 24. The rotation shaft 25 of the 2nd stirring mechanism 26 passes through the pass-through opening 23 and projects upwardly, and this end portion is connected to a drive source 27 such as an electric motor, etc. Further, an injection passage 28 which is for the purpose of injecting into the 2nd cylinder 20 the frozen food product which is in the junction box 19, i.e., the frozen food product which has been produced in the 1st cylinder 1 is provided at the rear portion of the 2nd cylinder 20. On the inner peripheral wall of the 2nd cylinder 20, there is installed a 2nd cooler 29, which is connected to a compressor 30, a condenser 31 and a capillary tube 32 in order to establish a freezing

cycle, the arrangement being that raw material inside the 2nd cylinder 20 is cooled to about -20°C - -40°C . A cock 33 is connected to the abovenoted pour-out port 21.

When, in a state in which the drive sources 8 and 27 are actuated and the two freezer cycles are made operative, ice cream raw materials are supplied via the raw material supply port 9, carbon dioxide is supplied via the gas supply port 10a and air is supplied via the air supply port 10b, the raw materials are stirred by the stirrer blade 5 inside the 1st cylinder 1 and are cooled to about -10°C . Therefore, the raw materials are kneaded and go to the state of a soft frozen food product, i.e., a soft cream state. Accompanying rotation of the stirrer blade 5, the soft frozen food product which has thus been produced in the 1st cylinder 1 is gradually poured out of the pour-out port 2 and it flows from the interior of the junction box 19 and goes via the injection passage 28 into the 2nd cylinder 20. Then, it is stirred by the stirrer blade 24 in the 2nd cylinder 20 and cooled to -20°C - -40°C by the 2nd cooler 29, so producing a comparatively hard frozen product. In this case, since the carbon dioxide which was supplied during kneading in the 1st cylinder 1 is incorporated in the frozen food product, ice-cream containing carbon dioxide is produced, and no escape of carbon dioxide occurs even when the ice cream is poured out from the pour-out port 21 of the 2nd cylinder 20 and received into cups, etc.

Needless to say, although a description relating to the manufacture of ice cream was given in the example above, the invention is not limited to this example, but it may be also applied to other frozen food products.

Since, as described above, a 1st cylinder and a 2nd cylinder are provided with respective stirring mechanisms, and the arrangement is made such that raw materials and gas are cooled by the 1st cylinder while being stirred and the resulting frozen food product is stirred and cooled to a still lower temperature by the 2nd cylinder, the invention makes possible the continuous manufacture of a frozen food product incorporating gas, and since the frozen food product produced in the preceding stage is cooled to a still lower temperature in the subsequent stage, a high-quality frozen food product can be produced without leakage of gas. There is also the advantage that the apparatus can be provided at low cost,

since it is structurally simple.

4. BRIEF DESCRIPTION OF THE DRAWING

The drawing is a vertical-section front view which shows one example of practice of the invention.

1 ... 1st cylinder, 7 ... 1st stirring mechanism, 8 ... drive source, 9 ... raw material supply port, 10a ... gas supply port, 15 ... 1st cooler, 20 ... 2nd cylinder, 26 ... 2nd stirring mechanism, 27 ... drive source, 29 ... 2nd cooler.

Applicant : T. Ichihara

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